Complete Summary

GUIDELINE TITLE

ACR Appropriateness Criteria® chronic neck pain.

BIBLIOGRAPHIC SOURCE(S)

Daffner RH, Weissman BN, Bennett DL, Blebea JS, Jacobson JA, Morrison WB, Resnik CS, Roberts CC, Rubin DA, Schweitzer ME, Seeger LL, Taljanovic M, Wise JN, Payne WK, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness Criteria® chronic neck pain. [online publication]. Reston (VA): American College of Radiology (ACR); 2008. 7 p. [27 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Daffner RH, Dalinka MK, Alazraki NP, DeSmet AA, El-Khoury GY, Kneeland JB, Manaster BJ, Pavlov H, Rubin DA, Steinbach LS, Weissman BN, Haralson RH III, Expert Panel on Musculoskeletal Imaging. Chronic neck pain. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 7 p. [21 references]

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Chronic neck pain

GUIDELINE CATEGORY

Diagnosis
Evaluation

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Neurology
Nuclear Medicine
Orthopedic Surgery
Radiology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for patients with chronic neck pain

TARGET POPULATION

Patients with chronic neck pain

INTERVENTIONS AND PRACTICES CONSIDERED

1. X-ray (anteroposterior [AP], lateral, open mouth, both obliques)
2. X-ray myelography
3. Computed tomography (CT) without contrast
4. Magnetic resonance imaging (MRI) without contrast
5. Myelography and post myelography CT
6. Nuclear medicine (NUC), technetium (Tc)-99m bone scan
7. Invasive (INV), facet injection/arthrography, selective nerve root block

Note: X-ray discography was considered but not recommended.

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of peer-reviewed medical journals, and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1 to 9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed

after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by this Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Chronic Neck Pain

Variant 1: Patient of any age, without or with a history of previous trauma, first study.

Radiologic Procedure	Rating	Comments	RRL*
X-ray cervical spine	9	AP, lateral, open mouth, both obliques.	Low
X-ray myelography cervical spine	2		None
CT cervical spine	2		Med

Radiologic Procedure	Rating	Comments	RRL*
without contrast			
Myelography and post myelography CT cervical spine	2		High
MRI cervical spine without contrast	2		None
NUC Tc-99 bone scan neck	2		Med
INV facet injection/arthrography, cervical spine selective nerve root block	2		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Patients of any age, history of previous malignancy, first study.

Radiologic Procedure	Rating	Comments	RRL*
X-ray cervical spine	9	AP, lateral, open mouth, both obliques.	Low
CT cervical spine without contrast	2		Med
MRI cervical spine without contrast	2		None
NUC, Tc-99 bone scan neck	2		Med
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 3: Patients of any age, history of previous neck surgery, first study.

Radiologic Procedure	Rating	Comments	RRL*
X-ray cervical spine	9	AP, lateral, open mouth, both obliques.	Low
CT cervical spine without contrast	2		Med
MRI cervical spine without contrast	2		None
NUC, Tc-99m bone scan neck	2		Med
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 4: Radiographs normal. No neurologic findings.

Radiologic Procedure	Rating	Comments	RRL*
X-ray myelography cervical spine	2		Med
CT cervical spine without contrast	2		Med
Myelography and post myelography CT cervical spine	2		High
MRI cervical spine without contrast	2		None
NUC Tc-99m bone scan neck	2		Med
INV facet injection/arthrography cervical spine selective nerve root block	2		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative**

Radiologic Procedure	Rating	Comments	RRL*
			Radiation Level

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 5: Radiographs normal. Neurologic signs or symptoms present.

Radiologic Procedure	Rating	Comments	RRL*
MRI cervical spine without contrast	9		None
Myelography and post myelography CT cervical spine	5	If MRI contraindicated	High
X-ray myelography cervical spine	2		Med
CT cervical spine without contrast	2		Med
NUC Tc-99m bone scan neck	2		Med
INV facet injection/arthrography cervical spine selective nerve root block	2		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 6: Radiographs show spondylosis. No neurologic findings.

Radiologic Procedure	Rating	Comments	RRL*
X-ray myelography cervical spine	2		Med

Radiologic Procedure	Rating	Comments	RRL*
CT cervical spine without contrast	2		Med
Myelography and post myelography CT cervical spine	2		High
MRI cervical spine without contrast	2		None
NUC Tc-99m bone scan neck	2		Med
INV facet injection/arthrography cervical spine selective nerve root block	2		Low
X-ray discography cervical spine	1		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 7: Radiographs show spondylosis. Neurologic signs or symptoms present.

Radiologic Procedure	Rating	Comments	RRL*
MRI cervical spine without contrast	9		None
Myelography and post myelography CT cervical spine	5	If MRI contraindicated	High
X-ray myelography cervical spine	2		Med
CT cervical spine without contrast	2		Med
NUC Tc-99m bone scan neck	2		Med

Radiologic Procedure	Rating	Comments	RRL*
INV facet injection/arthrography cervical spine selective nerve root block	2		Low
X-ray discography cervical spine	1		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 8: Radiographs show old trauma. No neurologic findings.

Radiologic Procedure	Rating	Comments	RRL*
X-ray myelography cervical spine	2		Med
CT cervical spine without contrast	2		Med
Myelography and post myelography CT cervical spine	2		High
MRI cervical spine without contrast	2		None
NUC Tc-99m bone scan neck	2		Med
INV facet injection/arthrography cervical spine selective nerve root block	2		Low
X-ray discography cervical spine	1		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 9: Radiographs show old trauma. Neurologic signs or symptoms present.

Radiologic Procedure	Rating	Comments	RRL*
MRI cervical spine without contrast	9		None
Myelography and post myelography CT cervical spine	5	If MRI contraindicated	High
X-ray myelography cervical spine	2		Med
CT cervical spine without contrast	2		Med
NUC Tc-99m bone scan neck	2		Med
INV facet injection/arthrography cervical spine selective nerve root block	2		Low
X-ray discography cervical spine	1		Low
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 10: Radiographs show bone or disc margin destruction.

Radiologic Procedure	Rating	Comments	RRL*
MRI cervical spine without contrast	9		None
X-ray myelography cervical spine	2		Med

Radiologic Procedure	Rating	Comments	RRL*
CT cervical spine without contrast	2		Med
Myelography and post myelography CT cervical spine	2		High
NUC TC-99m bone scan neck	2		Med
Rating Scale: 1=Least appropriate, 9=Most appropriate			***Relative Radiation Level**

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Recommendations

These guidelines apply to imaging of patients with chronic neck pain regardless of the etiology (trauma, arthritis, neoplasm):

- Patients of any age with chronic neck pain without or with a history of remote trauma should initially undergo a 5-view (anteroposterior [AP], lateral, open mouth, both obliques) radiographic examination.
- Patients with a history of previous malignancy should initially undergo a 3-view radiographic examination. Radionuclide bone scanning should not be the initial procedure of choice. (Barton et al., 1993).
- Patients with a history of neck surgery in the remote past should initially undergo a 3-view radiographic examination.
- Patients with normal radiographs and no neurologic signs or symptoms need no further imaging.
- Patients with normal radiographs and neurologic signs or symptoms should undergo magnetic resonance imaging (MRI). (Anderberg et al., 2004; Arana et al., 2004; Boutin, Steinbach, & Finnesey, 2000; Chen et al., 2003; Kaale et al., 2005). If there is a contraindication to the MRI examination such as a cardiac pacemaker or severe claustrophobia, computed tomography (CT) myelography, preferably using spiral technology and multiplanar reconstruction is recommended.
- Patients with radiographic evidence of cervical spondylosis or of previous trauma without neurologic signs or symptoms need no further imaging.
- Patients with radiographic evidence of cervical spondylosis or of previous trauma and neurologic signs or symptoms should undergo MRI. (Anderberg et al., 2004; Arana et al., 2004; Boutin, Steinbach, & Finnesey, 2000; Chen et al., 2003; Kaale et al., 2005). If there is a contraindication to MRI, CT myelography is recommended.
- Patients with radiographic evidence of bone or disc margin destruction should undergo MRI. If an epidural abscess is suspected, the examination should be

performed with intravenous contrast. CT is indicated only if MRI cannot be performed.
- Facet injection and arthrography are useful for patients with multilevel disease diagnosed by any imaging modality to identify the specific level(s) producing symptoms.
- Discography is not recommended. (Aprill & Bogduk, 1992; Bogduk & Aprill, 1993).
- Patients with chronic neck pain from "whiplash" should undergo imaging following the guidelines above.

Summary

There are no existing guidelines for the evaluation of the patient with chronic neck pain.

All investigators generally agree that plain radiographs should be the initial study performed for evaluating these patients. However, there is no consensus on exactly which views should be obtained for the initial study. The guideline developers recommend a basic 3-view study, with oblique radiographs added at the discretion of the attending physician.

MRI should be performed on all patients who have chronic neck pain with neurologic signs or symptoms, or both. If there is a contraindication to MRI, CT myelography is recommended.

The use of additional imaging procedures should be determined in a case-by-case manner, and the evaluation of patients with chronic neck pain should follow this "tailor-made" approach. Discography is not recommended.

Abbreviations

- AP, anteroposterior
- CT, computed tomography
- INV, invasive
- Med, medium
- MRI, magnetic resonance imaging
- NUC, nuclear medicine
- Tc, technetium

Relative Radiation Level	Effective Dose Estimated Range
None	0
Minimal	<0.1 mSv
Low	0.1-1 mSv
Medium	1-10 mSv
High	10-100 mSv

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for diagnosis and evaluation of patients with chronic neck pain

POTENTIAL HARMS

Relative Radiation Level (RRL)

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Additional information regarding radiation dose assessment for imaging examinations can be found in the American College of Radiology (ACR) Appropriateness Criteria® Radiation Dose Assessment Introduction document (see "Availability of Companion Documents" field).

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other

imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Daffner RH, Weissman BN, Bennett DL, Blebea JS, Jacobson JA, Morrison WB, Resnik CS, Roberts CC, Rubin DA, Schweitzer ME, Seeger LL, Taljanovic M, Wise JN, Payne WK, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness Criteria® chronic neck pain. [online publication]. Reston (VA): American College of Radiology (ACR); 2008. 7 p. [27 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1998 (revised 2008)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Musculoskeletal Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Richard H. Daffner, MD; Barbara N. Weissman, MD; D. Lee Bennett, MD; Judy S. Blebea, MD; Jon A. Jacobson, MD; William B. Morrison, MD; Charles S. Resnik, MD; Catherine C. Roberts, MD; David A. Rubin, MD; Mark E. Schweitzer, MD; Leanne L. Seeger, MD; Mihra Taljanovic, MD; James N. Wise, MD; William K. Payne, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Daffner RH, Dalinka MK, Alazraki NP, DeSmet AA, El-Khoury GY, Kneeland JB, Manaster BJ, Pavlov H, Rubin DA, Steinbach LS, Weissman BN, Haralson RH III, Expert Panel on Musculoskeletal Imaging. Chronic neck pain. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 7 p. [21 references]

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

ACR Appropriateness Criteria® *Anytime*, *Anywhere*™ (PDA application). Available from the ACR Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.
- ACR Appropriateness Criteria® radiation dose assessment introduction. American College of Radiology. 2 p. Electronic copies: Available from the American College of Radiology Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 6, 2001. The information was verified by the guideline developer as of June 29, 2001. This NGC summary was updated by ECRI on January 27, 2006. This NGC summary was updated by ECRI Institute on June 30, 2009.

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